

**lovE-37**

maadqgiftnsvtlspvegsrtggtlprrafrrrscdrchaqkikcignkevtgrapcqrccragl  
rcvysercpkrklrqsraadlvsadpdpclhmssppvpssqslpldvsseshssntsrqfldppdsy  
dswtsigtdeaiddtcwglsgcdggfscqleptlpdlpspfestvekaplppvssdiaraasaq  
relfddlsavsqeleeillavtvewpkqeiwthpigmffnasrrlltvlrqqaqadchqgtldec  
lrtknlfavhcyilnvriltaiselllsqirrtqnshmsplegsrsqsprrddtssssghscvd  
tipffsenlpigelfsyvdplthalfsacttlhvgvqllreyeitlgihsaggiaasismsgepg  
ediartgatnsarceeqpttpaarvlfmflsdegafqeaksagsrgrtiaalrrcyedifslark  
hkhgmlrdlnnipp (SEQ ID NO:61)

**lovE-38**

maadqgiftnsvtlspvegsrtggtlprrafrrrscdrcharkikctgnkevtgrapcqrccqagl  
rcvysercpkrklrqsraadlvsadpdpclhmssppvpssqslpldvsseshssntsrqfldppdsy  
dswtsigtdeaiddtcwglsgcdggfscqleptlpdlpspfestvekaplppvssdiaraasaq  
relfddlsavsqeleeillavtvewpkqeiwthpigmffnasrrlltvlrqqaqadchqgtldec  
lrtknlfavhcyilnvriltaiselllsqirrtqnshmsplegsrsqslsrrddtssssghssvd  
tipffsenlpidelfsyvdplthalfsacttlhvgvqllreneitlgvhsaggiaasismsgelg  
edivrtgatnsarceeqpttpaarvlfmflsdegafqeaksagsrsrtiaalrrcyedifslark  
hkhgmlrdlnnipp (SEQ ID NO:62)

**lovE-39**

maadqgiftnsvtlspvegsrtggtlprrafrrrscdrchaqkikctgnkevngrapcqrccqagl  
rcvysercpkrklrqsraadlvsadpdpclhmssppvpssqslpldiseshssntsrqfldppdsy  
dswtsigideaidtdcwglsgcdggfscqleptlpdlpspfestvekaplppissdiaraasaq  
relfddlsavsqeleeillavtvewpkqeiwthpigmffnasrrlltvlrqqaqadchqgtldec  
lrtknlfavhcyilnvrilaaiselllsqirrtqnshmsplegsrsqsprrddtssssghssvd  
tipffsenlpigelfsyvdplthalfsacttlhvgvqllreneitlgvhsaggiaasismsgepg  
ediartgatnsarceeqpttpaarvlfmflsdegafqeaksagsrgrtiaalrrcyedifslark  
hkhgmlrdlnnipp (SEQ ID NO:63)

**lovE-40**

maaeqgiftnsvtlspvegsrtggtlprrafrrrscdrcharkikctgnkevtgrapcqrccqagl  
rcvysercpkrklrqsraadlisadpdpclhmssppvpssqslplevsseshssntsrqfldppdsy  
dswtsigtdekaiddtcwglsgcdggfscqleptlpdlpspfestvekaplppvssditraasaq  
relfddlsavsqeleeillavtvewpkqeiwthpigmffnasrrlltvlrqqaqadchqgtldec  
lrtknlfavhcyildvriltaiselllsqirrtqnshmsplegsrsqsprrddtssssghssvd  
tipffsenlpigelfsyvdplrhalfsacttlhvgvqllreieitlgvhsargiaasismsgepg  
ediartgatnsarceeqpttpaarvlfmflsdegdfqeaksagsrgrtiaalrrcyedifslark  
hkhgmlrdlnnipp (SEQ ID NO:64)

**lovE-41**

maadqgiftnsvtlspvegsrtggtlprrafrrrscdrchaqkikctgnkevtgrapcqrccqagl  
rcvysercpkrklrqsraadlvsadpdpclhmssppvpssqslpldvsseshssntsrqfldppdsy  
nwlwtsigtdeaiddtcwglsgcdggfscqleptlpdlpspfestvekaplppvssdiaraasaq  
relfddlsavsqeleeillavtvewpkqeiwthpigmffnasrrlltvlrqqaqadchqgtldec  
lrtknlfavhcyilnvriltaiselllsqirrtqnshmsplegsrsqspsgddtssssghssvd  
tipffsenlpigelfsyvdplthalfsacttlhvgvqllreneitlgvhsaggiaasismsgepg  
ediartgatnsarceeqpttpaarvlfmflsdegafqegksagsrgrtiaalrrcyedifslark  
hkhgmlrdlnnipp (SEQ ID NO:65)

Table 6: DNA Sequences of Variants of the *lovE* Gene***lovE-1***

ATGGCTGCAGATCAAGGTATATTACGAACTCGGTCACTCTCTCGCCAGTGGAGGGTTACGCAC  
 CGGTGGAACATTACCCCGCCGTGCATTCCGACGCTCTTGTGATCGGTGTCATGCACAAAAGATCA  
 AATGTACTGGAAATAAGGAGGTTACTGGCCGTGCTCCCTGTCAGCGTTGCCAGCAGGCTGGACTT  
 CGATGCGTCTACAGTGAGCGATGCCCCAAGCGCAAGCTACGCCAATCCAGGGCAGCGGATCTCGT  
 CTCTGCTGACCCAGATCCCTGCTTGACATGTCTCGCCTCCAGTGCCCTCACAGAGCTTGCCGC  
 TAGACGTATCCGAGTCGCATTCTCAAATACCTCCCGGCAGTTTCTTGATCCACCGGACAGCTAC  
 GACTGGTTCGTGGACCTCGATTGGCACTGACGAGGCTATTGACACTGACTGCTGGGGGCTGTCCCA  
 ATGTGATGGAGGCTTCAGCTGTGAGTTAGAGCCAACGCTGCCGGATCTACCTTCGCCCTTCGAGT  
 CTACGGTTGAAAAAGCTCCGTTGCCACCGGTATCGAGCGACATTGCTCGTGCGGCCAGTGCGCAA  
 CGAGAGCTTTTCGATGACCTGTGCGCGGTGTGCGAGGAACTGGAAGAGATCCTTCTGGCCGTGAC  
 GGTAGAATGGCCGAAGCAGGAAATCTGGACCCATCCCATCGGAATGTTTTCAATGCGTCACGAC  
 GGCTTCTTACTGTCTGCGCCAACAAGCGCAGGCCGACTGCCGTCAAGGCACACTAGACGAATGT  
 TTACGGACCAAGAACCTCTTTACGGCAGTACACTGTTACATATTGAATGTGCGGATTTTGACCGC  
 CATATCGGAGTTGCTCCTGTGCGAAATTAGGCGGACCCAGAACAGCCATATGAGCCCACTGGAAG  
 GGAGTCGATCCAGTCGCCGAGCAGAGACGACACCAGCAGCAGCAGCGGCCACAGCAGTGTGAC  
 ACCATACCCTTCTTTAGCGGAACTCCCTATTGGTGAGCTGTTCCCTATGTTGACCCCTGAC  
 ACACGCCCTATTCTCGGCTTGCACTACGTTACATGTTGGGGTACAATTGCTGCGTGAGAATGAGA  
 TTACTCTGGGAGTACACTCCGCCCAGGGCATTGCAGCTTCCATCAGCATGAGCGGGGAACCAGGC  
 GAGGATATAGCCAGGACAGGGGCGACCAATTCCGCAAGATGCGAGGAGCAGCCGACCACTCCAGC  
 GGCTCGGGTTTTGTTTCATGTTCTTGAGTGATGAAGGGGCTTTCAGGAGGCAAAGTCTGCTGGTT  
 CCCGAGGTGCAACCATCGCAGCACTGCGACGATGCTATGAGGATATCTTTCCCTCGCCCGCAA  
 CACAAACATGGCATGCTCAGAGACCTCAACAATATTCTCCATGA (SEQ ID NO:66)

***lovE-2***

ATGGCTGCAGATCAAGGTATATTACGAACTCGGTCACTCTCTCGCCAGTGGAGGGTTACGCAC  
 CGGTGGAACATTACCCCGCCGTGCATTCCGACGCTCTTGTGATCGGTGTCATGCACAAAAGATCA  
 AATGTACTGGAAATAAGGAGGTTACTGGCCGTGCTCCCTGTCAGCGTTGCCAGCAGGCTGGACTT  
 CGATGCGTCTACAGTGAGCGATGCCCCAAGCGCAAGCTACGCCAATCCAGGGCAGCGGATCTCGT  
 CTCTGCTGACCCAGATCCCTGCTTGACATGTCTCGCCTCCAGTGCCCTCACAGAGCTTGCCGC  
 TAGACGTATCCGAGTCGCATTCTCAAATACCTCCTGGCAATTTCTTGATCCACCGGACAGCTAC  
 GACTGGTTGTGGACCTCGATTGGCACTGACGAGGCTATTGACACTGACTGCTGGGGGCTGTCCCA  
 ATGTGATGGAGGCTTCAGCTGTGAGTTAGAGCCAACGCTGCCGGATCTACCTTCGCCCTTCGAGT  
 CTACGGTTGAAAAAGCTCCGTTGCCACCGGTATCGAGCGACATTGCTCGTGCGGCCAGTGCGCAA  
 CGAGAGCTTTTCGATGACCTGTGCGCGGTGTGCGAGGAACTGGAAGAGATCCTTCTGGCCGTGAC  
 GGTAGAGTGGCCGAAGCAGGAAATCTGGACCCATCCCATCGGAATGTTTTCAATGCGTCACGAC  
 GGCTTCTTACTGTCTGCGCCAACAAGCGCAGGCCGACTGCCATCAAGGCACACTAGACGAATGT  
 TTACGGACCAAGAACCTCTTTACGGCAGTACACTGTTACATATTGAATGTGCGGATTTTGACCGC  
 CATATCGGAGTTGCTCCTGTGCGAAATTAGGCGGACCCAGAACAGCCATATGAGCCCACTGGAAG  
 GGAGTCGATCCAGTCGCCGAGCAGAGACGACACCAGCAGCAGCAGCGGCCACGGCAGTGTGAC  
 ACCATACCCTTCTTTAGCGGAACTCCCTATTGGTGAGCTGTTCTCCTATGTTGACCCCTGAC  
 ACACGCCCTATTCTCGGCTTGCACTACGTTACATGTTGGGGTACAATTGCTGCGTGAGAATGAGA  
 TTACTCTGGGAGTACACTCCGCCCAGGGCATTGCAGCTTCCATCAGCATGAGCGGGGAACCAGGC  
 GAGGATATAGCCAGGACAGGGGCGACCAATTCCGCAAGATGCGAGGAGCAGCCGACCACTCCAGC  
 GGCTCGGGTTTTGTTTCATGTTCTTGAGTGATGAAGGGGCTTTCAGGAGGCAAAGTCTGCTGGTT  
 CCCGAGGTGCAACCATCGCAGCACTGCGACGATGCTATGAGGATATCTTTCCCTCGCCCGCAA  
 CACAAACATGGCATGCTCAGAGACCTCAACAATATTCTCCATGA (SEQ ID NO:67)

**lovE-3**

ATGGCTGCAGATCAAGGTATATTACGAACTCGGTCACTCTCTCGCCAGTGGAGGGTTACGCGAC  
 CGGTGGAACATTACCCCGCCGTGCATTCCGACGCTCTTGTGATCGGTGTCATGCACAAAAGATCA  
 AATGTACTGGAAATAAGGAGGTTACTGGCCGTGCTCCCTGTCAGCGTTGCCAGCAGGCTGGACTT  
 CGATGCGTCTACAGTGAGCGACGCCCCAAGCGCAAGCTACGCCAATCCAGGGTAGCGGATCTCGT  
 CTCTGCTGACCCAGATCCCTGCTTGACATGTCTCGCCTCCAGTGCCCTCACAGAGCTTGCCGC  
 TAGACGTATCCGAGTCGCATTCTCAAATACCTCCCGGCAATTTCTTGATCCACCGGACAGCTAC  
 GACTGGTCGTGGATCTCGATTGGCACTGACGAGGCTATTGACACTGACTGCTGGGGGCTGTCCCA  
 ATGTGATGGAGGCTTCAGCTGTGAGTTAGAGCCAACGCTGCCGGATCTACCTTCGCCCTTCGAGT  
 CTACGGTTGAAAAAGCTCCGTTGCCACCGGTATCGAGCGACATTGCTCGTGCGGCCAGTGCGCAA  
 CGAGAGCTTTTCGATGACCTGTGCGCGGTGTGCGAGGAACTGGAAGAGATCCTTCTGGCCGTGAC  
 GGTAGAATGGCCGAAGCAGGAAATCTGGACCCATCCCATCGGAATGTTTTCAATGCGTCACGAC  
 GGCTTCTTACTGTCTGCGCCAACAAGCGCAGGCCGACTGCCATCAAGGCACACTAGACGAATGT  
 TTACGGACCAAGAACCTCTTTACGGCAGTACACTGTTACATATTGAATGTGCGGATTTTGACCGC  
 CATATCGGAGTTGCTCCTGTGCAAAATTAGGCGGACCCAGAACAGCCATATGAGCCCACTGGAAG  
 GGAGTCGATCCAGTCGCCGAGCAGAGACGACACCAGCAGCAGCAGCGGCCACAGCAGTGTGAC  
 ACCATACCCTTCTTTAGCGAGAACCTCCCTATTGGTGAGCTGTTCTCTATGTTGACCCCTGAC  
 ACACGCCCTATTCTCGGCTTGCACTACGTTACATGTTGGGGTACAATTGCTGCGTGAGAATGAGA  
 TTACTCTGGGAGTACACTCCGCCCAGGGCATTGCAGCTTCCATCAGCATGAGCGGGGAACCAGGC  
 GAGGATATAGCCAGGACAGGGGCGACCAATTCGCAAGATGCGAGGAGCAGCCGACCACTCCAGC  
 GGCTCGGGTTTTGTTTATGTTCTTGAGTGATGAAGGGGCTTTCCAGGAGGCAAAGTCTGCTGGTT  
 CCCGAGGTGCAACCATCGCAGCACTGCGACGATGCTATGAGGATATCTTTTCCCTCGCCCGCAA  
 CACAAACATGGCATGCTCAGAGACCTCAACAATATTCCTCCATGA (SEQ ID NO:68)

**lovE-4**

ATGGCTGCAGATCAAGGTATATTACGAACTCGGTCACTCTCTCGCCAGTGGAGGGTTACGCGAC  
 CGGTGGAACATTACCCCGCCGTGCATTCCGACGCTCTTGTGATCGGTGTCATGCACAAAAGATCA  
 AATGTACTGGAAATAAGGAGGTTACTGGCCGTGCTCCCTGTCAGCGTTGCCAGCAGGCTGGACTT  
 CGATGCGTCTACAGTGAGCGACGCCCCAAGCGCAAGCTACGCCAATCCAGGGCAGCGGATCTCGT  
 CTCTGCTGACCCAGATCCCTGCTTGACATGTCTCGCCTCCAGTGCCCTCACAGAGCTTGCCGC  
 TAGACGTATCCGAGTCGCATTCTCAAATACCTCCCGGCAATTTCTTGATCCACCGGACAGCTAC  
 GACTGGTCGTGGACCTCGATTGGCACTGACGAGGCTATTGACACTGACTGCTGGGGGCTGTCCCA  
 ATGTGATGGAGGCTTCAGCTGTGAGTTAGAGCCAACGCTGCCGGATCTACCTTCGCCCTTCGAGT  
 CTACGGTTGAAAAAGCTCCGTTGCCACCGGTATCGAGCGACATTGCTCGTGCGGCCAGTGCGCAA  
 CGAGAGCTTTTCGATGACCTGTGCGCGGTGTGCGAGGAACTGGAAGAGATCCTTCTGGCCGTGAC  
 GGTAGAATGGCCGAAGCAGGAAATCTGGACCCATCCCATCGGAATGTTTTCAATGCGTCACGAC  
 GGCTTCTTACTGTCTGCGCCAACAAGCGCAGGCCGACTGCCATCAAGGCACACTAGACGAATGT  
 TTACGGACCAAGAACCTCTTTACGGCAGTACACTGTTACATATTGAATGTGCGGATTTTGACCGC  
 CATATCGGAGTTGCTCCTGTGCAAAATTAGGCGGACCCAGAACAGCCATATGAGCCCACTGGAAG  
 GGAGTCGATCCAGTCGCCGAGCAGAGACGACACCAGCAGCAGCAGCGGCCACAGCAGTGTGAC  
 ACCATACCCTTCTTTAGCGAGAACCTCCCTATTGGTGAGCTGTTCTCTATGTTGACCCCTGAC  
 ACACGCCCTATTCTCGGCTTGCACTACGTTACATGTTGGGGTACAATTGCTGCGTGAGAATGAGA  
 TTACTCTGGGAGTACACTCCGCCCAGGGCATTGCAGCTTCCATCAGCATGAGCGGGGAACCAGGC  
 GAGGATATAGCCAGGACAGGGGCGACCAATTCGCAAGATGCGAGGAGCAGCCGACCACTCCAGC  
 GGCTCGGGTTTTGTTTATGTTCTTGAGTGATGAAGGGGCTTTCCAGGAGGCAAAGTCTGCTGGTT  
 CCCGAGGTGCAACCATCGCAGCACTGCGACGATGCTATGAGGATATCTTTTCCCTCGCCCGCAA  
 CACAAACATGGCATGCTCAGAGACCTCAACAATATTCCTCCATGA (SEQ ID NO:69)